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ABSTRACT

In order to determine the effectiveness of a reciprocal teaching procedure, a study examined the effects of instruction in metacognitive techniques on the reading comprehension of technical students. Subjects were 150 male students in a post-secondary occupational training program in diesel mechanics. A 4-part metacognitive process was taught and practiced in six sessions over a 2-week period through reciprocal teaching with one experimental group (requiring students to assume the role of teacher in a round-robin activity), and through conventional teacher-centered whole class instruction with another. Control groups either read or engaged in non-reading activities during the experiment. Pre- and posttests were administered immediately and after 5 weeks, along with other posttest comprehension measures. Results obtained immediately after intervention supported the effectiveness of the 4-part comprehension strategy, but favored neither instructional method. After 5 weeks, no differences in reading comprehension were shown among all four groups on follow-up measures devised by the experimenters, while the posttest showed significant differences favoring the experimental group which received conventional instruction. (One table of data is included.) (SR)

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THE EFFECTS OF RECIPROCAL TEACHING OF SELF-REGULATION OF READING COMPREHENSION IN A POSTSECONDARY TECHNICAL SCHOOL PROGRAM

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ABSTRACT

This study examined the effects, over a nine-week period, of instruction in metacognitive techniques on the reading comprehension of students in a technically oriented post-secondary occupational training program. A total of 150 students, enrolled in a six-month diesel mechanics course of study participated. All were males, and the vast majority had matriculated in the technical program within a year of high school graduation.

A four-part process (prediction, summarization, question formation, and identification of confusion) was taught and practiced through reciprocal teaching with one experimental group and through conventional teacher-centered whole class instruction with another. Control groups either read "as usual" or engaged in non-reading activities during the experiment.

Pretest, baseline, intervention, maintenance, and follow-up, and posttest comprehension measures were taken. Pre- and posttests involved alternate forms of the Cooperative English Test, Level 2. Other measures involved reading five-hundred word selections and responding to ten short answer comprehension questions which. Of the ten questions, four were text explicit, three were text implicit, and three were script implicit.

Although, the reciprocal teaching group seemed more actively involved with the information in the readings, preliminary analysis showed their performance after the intervention phase was not better than that of the other groups. Results favored the four-part procedure, but neither experimental format showed superiority immediately after the intervention phase of the study. After five weeks, no differences in reading comprehension were shown on follow-up comprehension measures

devised by the experimenters. Posttest scores on the Cooperative English Test, however, showed significant differences favoring the experimental group which received conventional, whole-class instruction compared with control groups.

We surmise that advantages to the whole-class instruction group reflected the traditional format of the technical school which cooperated in the study. Further, the results suggest that extending the period of instruction and practice may enhance the long-term effects of both the four-part process and reciprocal teaching.

Background

Self-awareness and self-regulation (metacognitive processes) are widely acknowledged as important factors in comprehension and learning (Armbruster and Brown, 1984). In problem solving and learning contexts, superior performers self-monitor their levels of success and adjust appropriately.

The notion that strategies for more effective learning can be taught has received considerable attention from researchers during the past decade. In the context of problem solving, Sternberg, (1977), suggests the possiblity that intellectual aptitude can be enhanced through instruction in the use of metacognitive methods. Examinations of the effects of self-regulatory strategies on learning show the positive influence of learning-to-learn strategies on new learning experiences (Bransford, 1979).

Self-regulation of reading comprehension and learning has been the focus of recent studies (Collins and Smith, 1982; Palincsar, 1984) which have emphasized specific aspects of how to teach students to self-monitor and self-regulate comprehension and learning. While noting

that training in such techniques results in worthwhile and reliable improvements, Baker and Brown (1984) express chagrin over the lack of research dealing with adult metacognition.

Method

The study examined the effectiveness of reciprocal teaching as a method of instructing students in a metacognitive reading comprehension procedure. Reciprocal teaching is derived from the ReQuest Procedure (Manzo, 1969), which has been extended by Collins and Smith (1982) and refined by Palincsar (1984) as a tool for enhancing the text comprehension of junior high school remedial readers. A small-group method, reciprocal teaching requires students to demonstrate participation and learning by assuming the role of teacher in a round-robin activity.

The metacognitive comprehension method involves four comprehension monitoring/regulating techniques known to be important in comprehension--self-questioning, summarizing, predicting, and critical evaluation of text.

Four groups of forty student subjects and their instructors were involved in the study. Group One learned and practiced the four part comprehension strategy through reciprocal teaching. Group Two learned and practiced the comprehension method through conventional teacher-centered lecture/demonstration and practice activities. Group Three performed course-related reading activities during the time that the experimental groups engaged in comprehension activities. Group Four engaged in routine, non-reading course activities.

Subjects

The study involved four equal groups of approximately forty randomly assigned students who were enrolled in a post secondary technical diesel automotive training program. The courses involved in the study were required in the technical curriculum.

Design

The design of the study involved a repeated measures, multiple-baseline across groups experimental procedure. Experimental groups experienced four conditions: baseline, intervention with instruction by teacher, maintenance, and follow-up. Each condition involved reading a brief assessment passage and writing brief answers to ten comprehension questions. A standardized test of reading comprehension (The Cooperative English Test) was administered before baseline and after follow-up phases of the study. The control groups participated in non-experimental activities, but completed the same assessment tasks, including pre-tests and post-tests, as the other groups.

Prior to initiation of the study, separate one-hour training sessions were conducted for the lead technical instructor, who then conducted all experimental and testing sessions. For the instructor and four students of Group One, this consisted of the investigator's explanation of the four comprehension self-monitoring/enhancing activities--question formulation, summarization, prediction, and critical evaluation of text--and an introduction to the reciprocal teaching procedure. Instructional techniques were then demonstrated by the investigator and practiced under his supervision by the instructor and students.

The training session for Group Two procedures involved a discussion of the four-part comprehension method with the training instructor, followed by demonstration and simulation of its presentation to a large group of students.

For Group Three, the training instructor received demonstration and practice in the use of review, overview, and vocabulary in introducing reading assignments.

Procedures

Procedures for Groups One, Two, and Three were the same, except for Intervention, the second stage of the study. Group Four participated in pre- and posttest activities only. Otherwise, throughout the study, Group Four engaged in normal technical program activities.

Baseline activities involved three 10 minute sessions in which all students read technically-oriented assessment passages "as you usually read." A taxonomy (Pearson and Johnson, 1978) was used to develop text-explicit (answer stated in text), text-implicit (answer in text, but not in one place), and script-implicit (answer derived from experience) questions for evaluating student comprehension.

Intervention activities for Group One invclved reciprocal teaching in the use of the four self-regulated comprehension activities during twenty-minute sessions on six sessions over a two-week period. Sub-groups of four students were formed within the class. Each sub-group was led by a trained student who began by modeling application of the four comprehension self-monitoring/regulating techniques, then passed the group leader's role along to student members of the group. In the final five minutes of each 20 minute intervention session, assessment passages were read and comprehension questions answered.

For Group Two, intervention activities were the same, except that reciprocal teaching was not involved. Instead, the four-step comprehension method was taught through teacher demonstration and practiced independently by students.

For equal amounts of time, at this and other stages of the study, Group Three participated in reading activities which did not involve experimental treatments. Group Four engaged in routine, non-reading coursework during the same time periods that other groups read.

Maintenance activities for all groups were conducted over three sessions during the week immediately following the intervention sessions. Maintenance sessions were similar in length and format to baseline sessions.

Follow-up Assessment of all groups was conducted five weeks after the maintenance sessions were concluded. During a single one-half hour session, three assessment passages were done in order to evaluate the effects of training and practice on reading comprehension.

During the course of the study, all student subjects were asked to keep daily logs of their reading activities. This was to provide indications of the degree to which reading skills were used.

At each stage of the study, all students were told of research evidence that successful workers are careful, thorough readers.

Materials

Intervention sessions were conducted with training passages of expository prose selected from technical texts. Assessment passages of approximately 400 words, used at the end of each training session, were taken from expository materials of different content, but similar difficulty, compared to the training materials. Pre- and posttests

involved administration of the Cooperative English Test, Forms 2A and 2B.

Results

Preliminary analyses show statistically significant differences favoring one or both of the two experimental groups which received training in the use of predicting, summarizing, questioning, and identifying confusion.

The ONEWAY analysis of variance procedure of the Statistical Package for the Social Sciences, shows similar pretest and follow-up/posttest performance for all groups. The Baseline performance of Group Two (conventional, whole group instruction) was superior to the control group's. During the Intervention phase, Group One (the small group reciprocal teaching group) performed better than the control group. In the Maintenance phase, both experimemtal groups performed significantly better than the control group.

After five weeks of routine activities, Follow-up measures showed no difference in group performance, but on the post experimental administration of the Cooperative English Test, Group Two performed significantly better than the control group.

Conclusions and Discussion

The central purpose of the study was to determine the effectiveness of the widely accepted reciprocal teaching procedure on the reading comprehension of technical school students. In question was the relative value, compared to conventional whole-class instruction, of the small-group reciprocal process as a means of teaching summarization, question formation, critical analysis, and prediction. Intuitive

observations of the technical school faculty and the researcher who observed in the school suggested that reciprocal teaching was, indeed, more effective in involving students meaningfully with the passages read as part of the study. On the basis of their observations, school faculty discussed plans for using reciprocal teaching as a method of enhancing learning school subject matter.

The preliminary results of the study support the effectiveness of the four part comprehension strategy, whether taught in small group or whole-class formats. The results suggest that six training sessions, while temporarily effective in enhancing reading comprehension among post-secondary technical school students, have no long-term effects.

It is possible, however, that the students of this highly regimented technical school program were more comfortable with whole class instruction. Small-group reciprocal teaching procedures, which produced promising levels of student involvement, might prove more effective if implemented over a longer period. The effects of this instructional format on reading comprehension and learning deserve further study.

The results of this preliminary analysis of the study suggest that reciprocal teaching procedure may not be as effective as traditional teacher-centered instruction with students in technical training programs. Prior research with poorer junior high school readers supported the use of small-group reciprocal teaching as a means of improving reading comprehension. In this study, although instructors and experimenters observed greater student enthusiasm and involvement among the reciprocal teaching group, the four comprehension enhancing techniques--summarization, question formation, critical analysis, and prediction--proveded no more effective in reciprocal teaching than when taught through conventional, large-group, teacher-centered instruction.

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TABLE ONE
ONEWAY Analysis of Variance Means

	Coop. Eng. Pre	Post	Comprehension Measures Base.	Interv.	Maint.	Follow-up
Grp. 1	28	25.3	16.7	19.20*	18.80*	13.972
Grp. 2	28	30.7826*	18.13*	18.13	20.565*	17.025
Grp. 3	28	23.133^	15.066^	15.40^	15.333^	14.27
Grp. 4	28	26.8	---	---	---	---

* denotes means which are significantly different (.05 level of segnificance) from means marked ^

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